Ministry of Defence

Headquarters Air Command

Room 1W27, Spitfire Block
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High Wycombe
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29 January 2021

AIRSPACE CHANGE PROPOSAL – ACP-2020-100

This document forms part of the airspace change process (ACP) as defined in the Civil Aviation Publication (CAP) 1616. ACP-2020-100 has been commenced in order to implement segregated airspace in the form of Temporary Danger Areas (TDAs) in the vicinity of both RAF Waddington and RAF Lossiemouth during the Summer of 2021. The ACP sponsor is the Ministry of Defence (MOD). Details of this ACP, including all supporting documents can be found on the CAA's online airspace change portal[1].

All changes to UK airspace are legally required to follow the process laid down in CAP 1616. Details of the process are available online[2]. Following this process ensures a fair and transparent flow of information between the change sponsor and any affected stakeholders. The CAA, as an impartial regulator, will hold the change sponsor to account and ensure that CAP 1616 is followed correctly as part of its decision-making responsibility.

The aim of this letter is to inform all stakeholders of the proposed introduction of 2 TDAs, one each in the vicinities of RAF Waddington and RAF Lossiemouth and to ensure that everyone has a full understanding of what, if any, effect it may have on them and to provide them with the opportunity to comment. This letter forms part of the ACP engagement activity and is being sent to you as an identified stakeholder for comment.

Background

The MOD is supporting the deployment of the Protector prototype into the UK airspace in the Summer of 2021. Protector is the large Remotely Piloted Air System (RPAS) being procured by the MOD and due to come into service in 2023, for which the MOD has commenced an airspace change that you or your office may have been engaged with during Stage 1 of the ACP process (see ACP-2019-18). Protector's prototype MQ-9B, named **SkyGuardian,** is a civil-registered RPAS, which will be deployed to the UK this summer and operated by its manufacturer, General Atomics Aeronautical Systems Incorporated.

SkyGuardian has a 79ft wingspan, is powered by a Honeywell TPE331-10 Turboprop engine and has a gross maximum take-off weight of 12,500lb (5670kg). A data sheet provided by the manufacturer is attached at the end of this letter and a link to the sheet is at the footnote below[3].

The image to the left is of SkyGuardian's arrival in the UK in 2018 after its non-stop transatlantic flight en route to RAF Fairford.

[1] https://airspacechange.caa.co.uk/ProposalArea?pID=324
[2] https://publicapps.caa.co.uk/docs/33/CAP1616E2interactive.pdf

[3] mq9b-skyguardian-datasheet.pdf (ga-asi.com)

SkyGuardian will be operated from 2 locations in the UK this summer. The locations, provisional dates and forecast activities for the deployment, as known at the time of writing are as follows:

- RAF Waddington from early July to early September 2021. Test flights and demonstration activity are anticipated as part of the ongoing airspace integration of RPAS within UK airspace;
- RAF Lossiemouth from early September to end October 2021. Participation in military exercises is anticipated.

One important aspect in the development of SkyGuardian, is that it will be fitted with an onboard detect and avoid (DAA) system during its deployment. This system has been approved for use by the Federal Aviation Administration (FAA), which is the American equivalent of the UK CAA.

Reasons for the Airspace Change

CAA guidance for unmanned air system (UAS) operations in UK airspace is set out in CAP 722, which states the criteria for beyond visual line of sight (BVLOS) RPAS operation. One of the requirements is the presence of a DAA capability that has been accepted as at least equivalent to the ability of pilot see and avoid, and ensures compliance with the Rules of the Air[4]. SkyGuardian is fitted with a DAA capability, which has been tested extensively in the USA and has been issued with an approval to operate by the FAA with some restrictions. An application for approval to fly with similar restrictions in the UK has been submitted to the CAA. If an approval is forthcoming for flight in the UK, it is hoped that SkyGuardian will be able to operate without restriction above FL100, but it is also possible that the approval might be forthcoming for flight without restriction as low as 3000ft above ground level (AGL). The work is ongoing and it is not known at this stage what will be the final outcome.

During the Assessment Meeting for this ACP with the CAA, it was decided that any such restriction on flight would best be managed by the implementation of segregated airspace in the form of a TDA. Therefore, the change sponsor will be submitting an application for a TDA at both RAF Waddington and RAF Lossiemouth to cater for any forthcoming restrictions. Since it is not yet clear what the level of restrictions may be, the MOD is presenting a TDA design incorporating a vertical split to cater for either possibility.

Establishment of the Proposed TDAs

One single design has been created which can be duplicated for use to enable the operation of SkyGuardian at either RAF Waddington or RAF Lossiemouth. The establishment of the TDAs will provide the required volume of segregated airspace to support SkyGuardian's departure and recovery profiles at either location and to enable the air vehicle to access airspace within which the on-board DAA capability may be used without further need for segregation.

The TDAs are of the same dimensions for each aerodrome. The TDAs are centred on the aerodrome reference point (ARP)[5] and are aligned with the main runway. Dimensions are as follows:

- 10nm wide, extending 5nm either side of the main runway centreline for both runway directions;
- 18nm long with the north-east and south-west boundaries following a 9nm arc measured from the ARP

[4] CAP 722 v8, 1.2.3.1

[5] Aerodrome Reference Point is the designated geographical location of an aerodrome, normally taken as the geometrical centre of the runways.

- The vertical dimensions are:
    - Area A is from surface level to an upper level of 3000ft above aerodrome level (AAL)
    - Area B has a lower limit of 3000ft AAL and an upper limit of FL100

Proposed TDA at RAF Waddington

Figure 1 illustrates the lateral dimensions of the TDA at RAF Waddington and Figure 2 illustrates a cross-section of the TDA from a north/south perspective Figure 3 illustrates a cross-section from a west/east perspective. Figures 2 and 3 also depict the vertical split between Areas A and B and show a representation of some of the surrounding airspace structures.

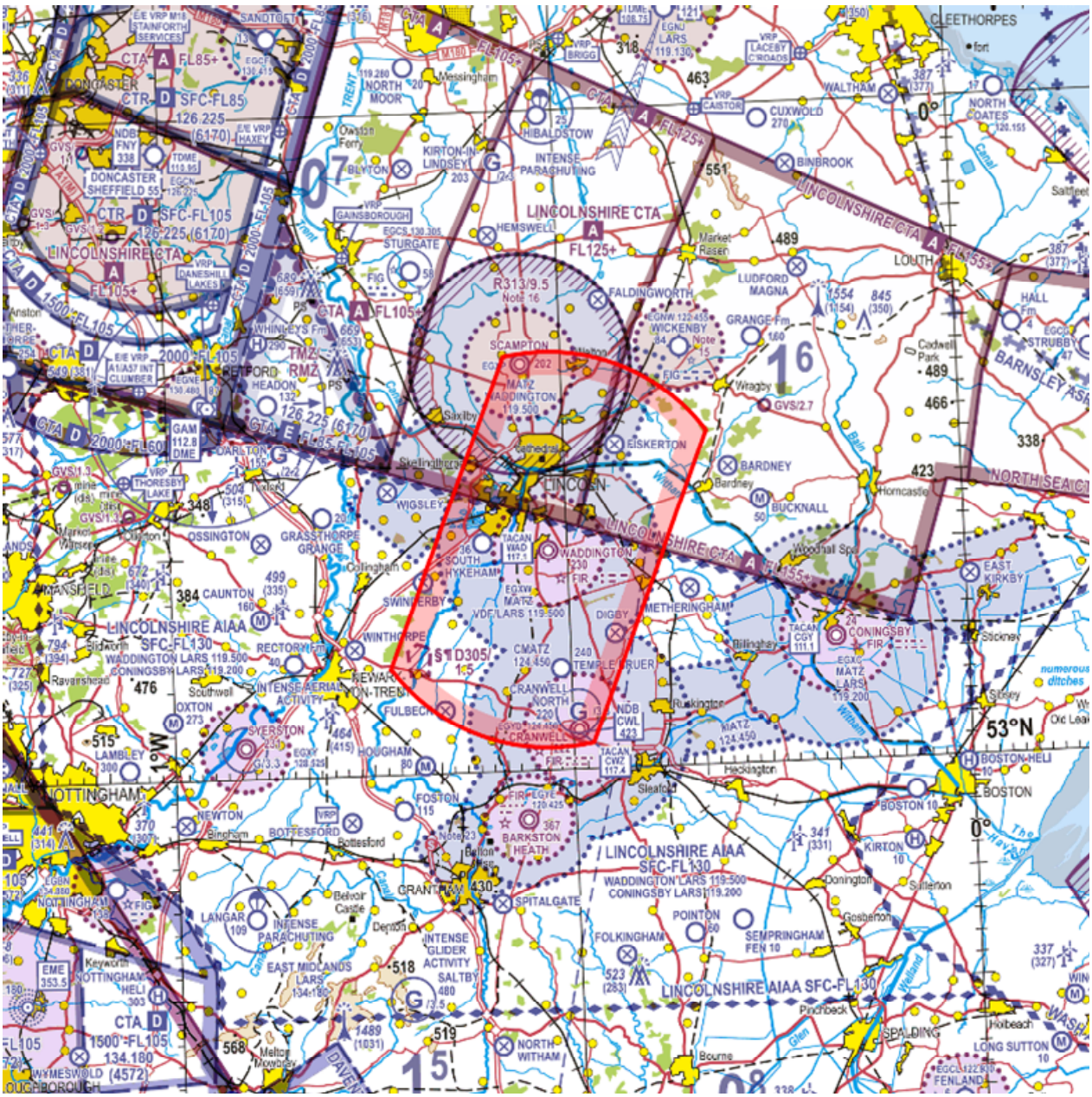

Figure 1 - RAF Waddington TDA Design

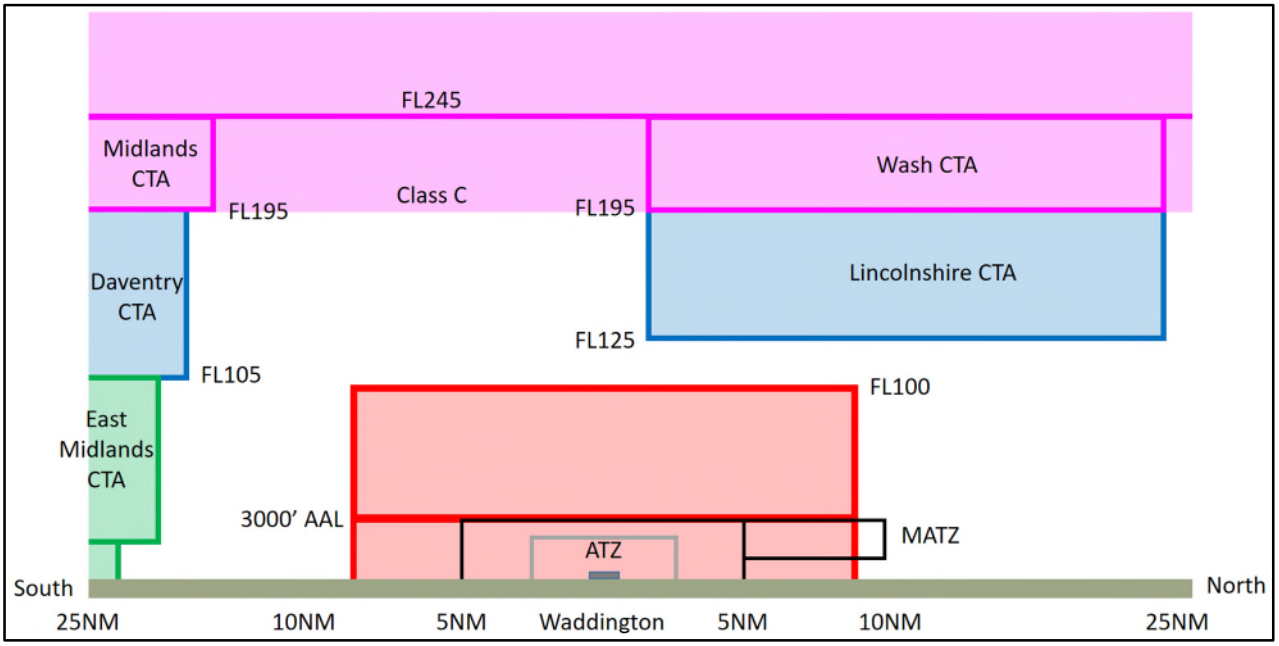

Figure 2 - RAF Waddington N/S TDA Cross-section

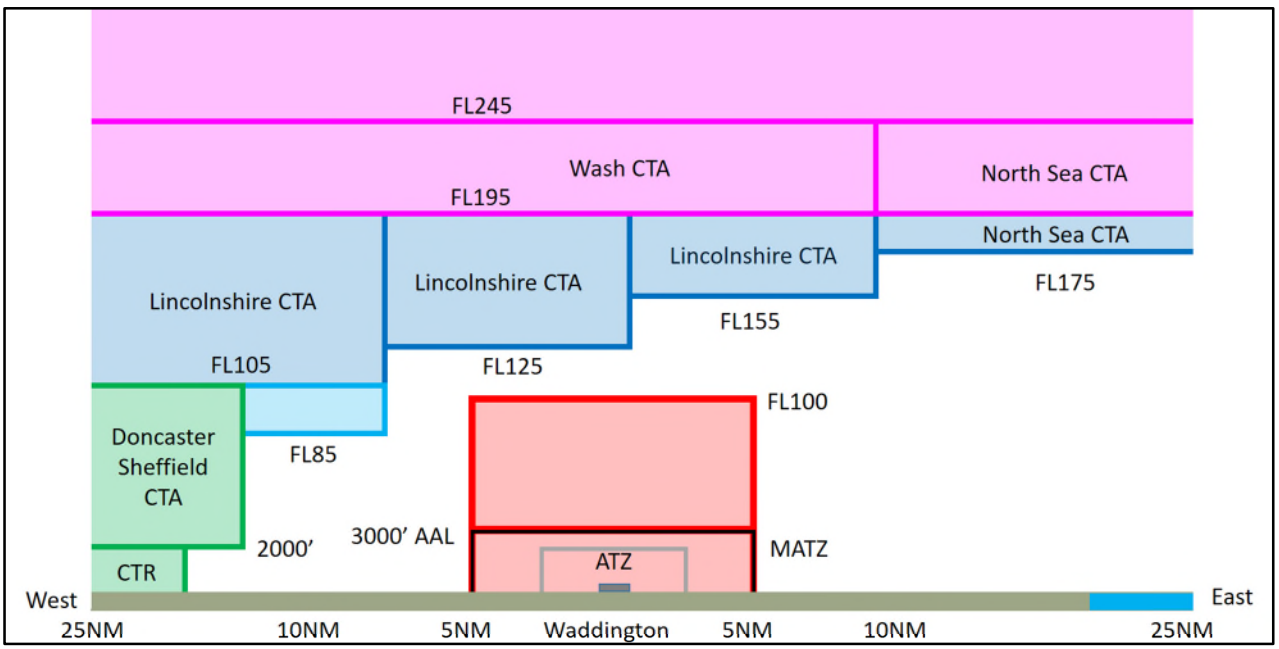

Figure 3 - RAF Waddington TDA W/E Cross-section

Proposed TDA at RAF Lossiemouth

Figure 4 illustrates the position and lateral dimensions of the TDA at RAF Lossiemouth and Figure 5 illustrates a cross-section of the TDA from a north-east/south-west perspective. Figure 6 illustrates a cross-section from a north-west/south-east perspective. Figures 5 and 6 also depict the vertical split between Areas A and B and show a representation of the surrounding airspace structures.

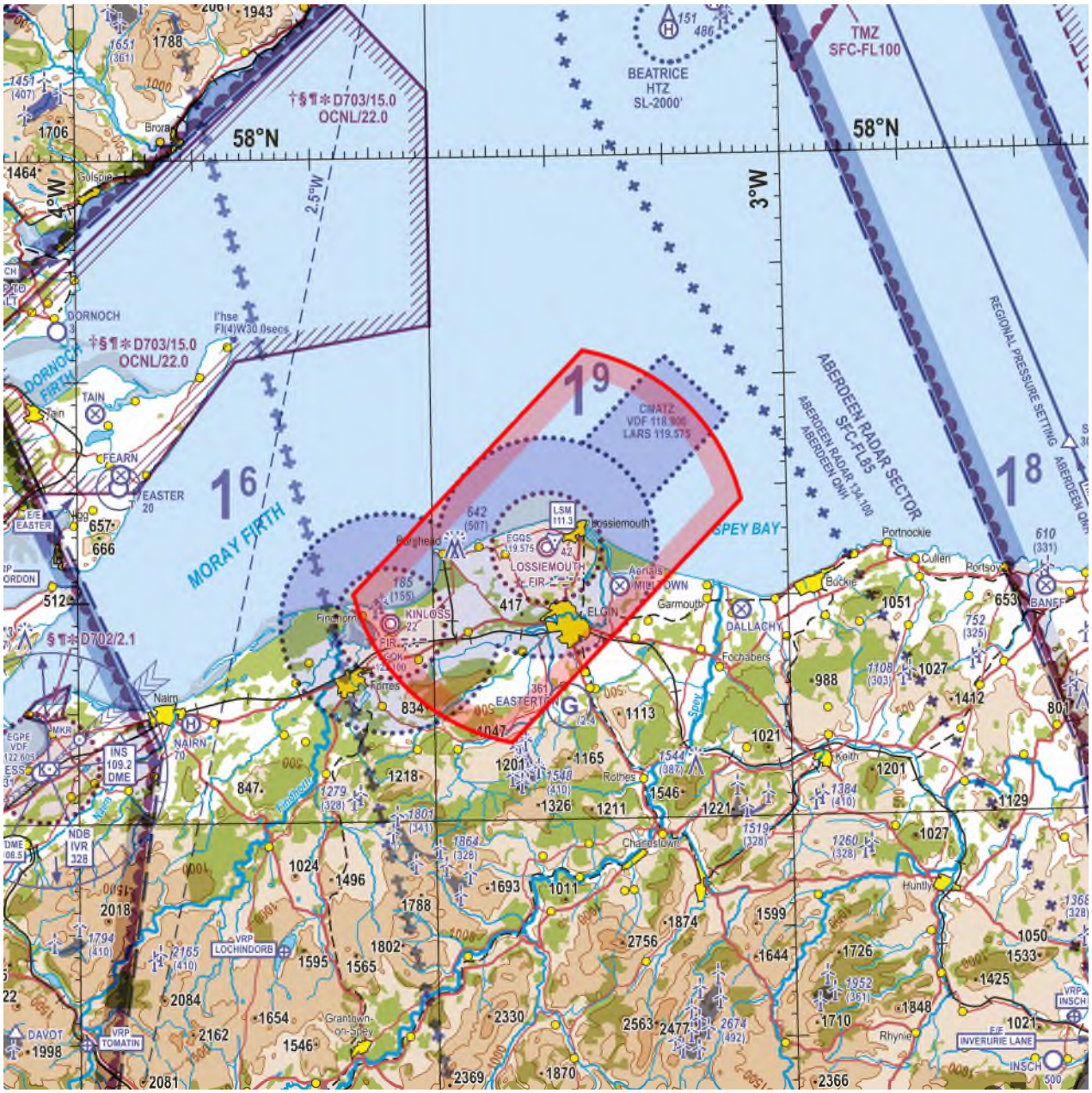

Figure 4 - RAF Lossiemouth TDA Design

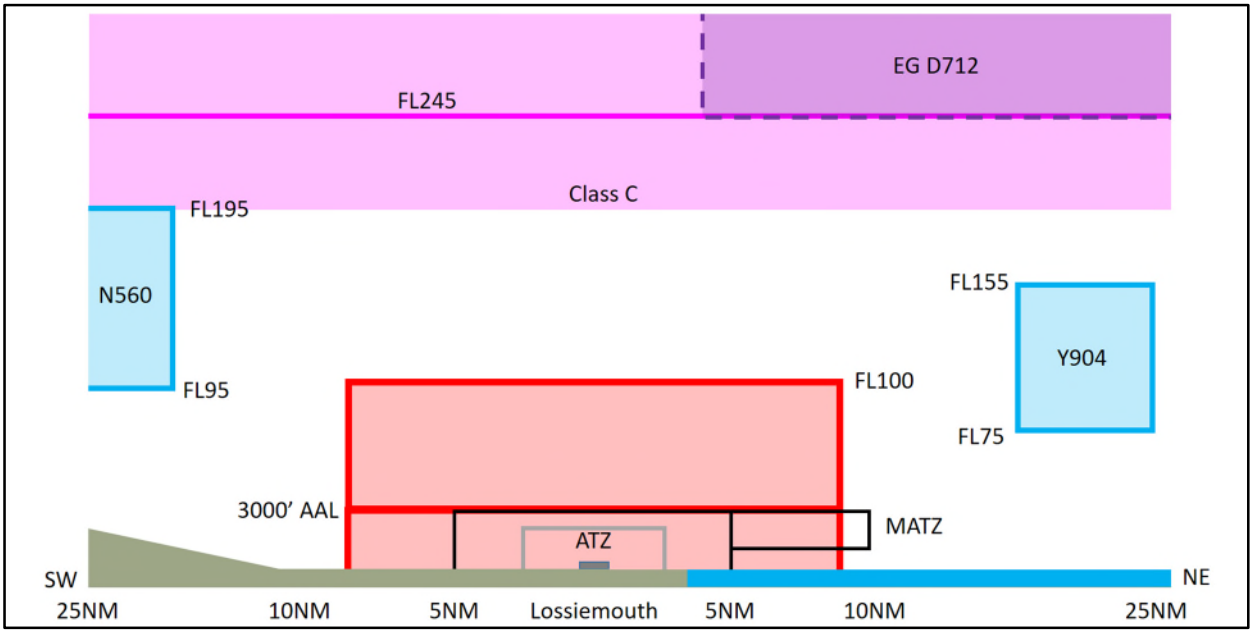

Figure 5 - RAF Lossiemouth TDA NE/SW Cross-section

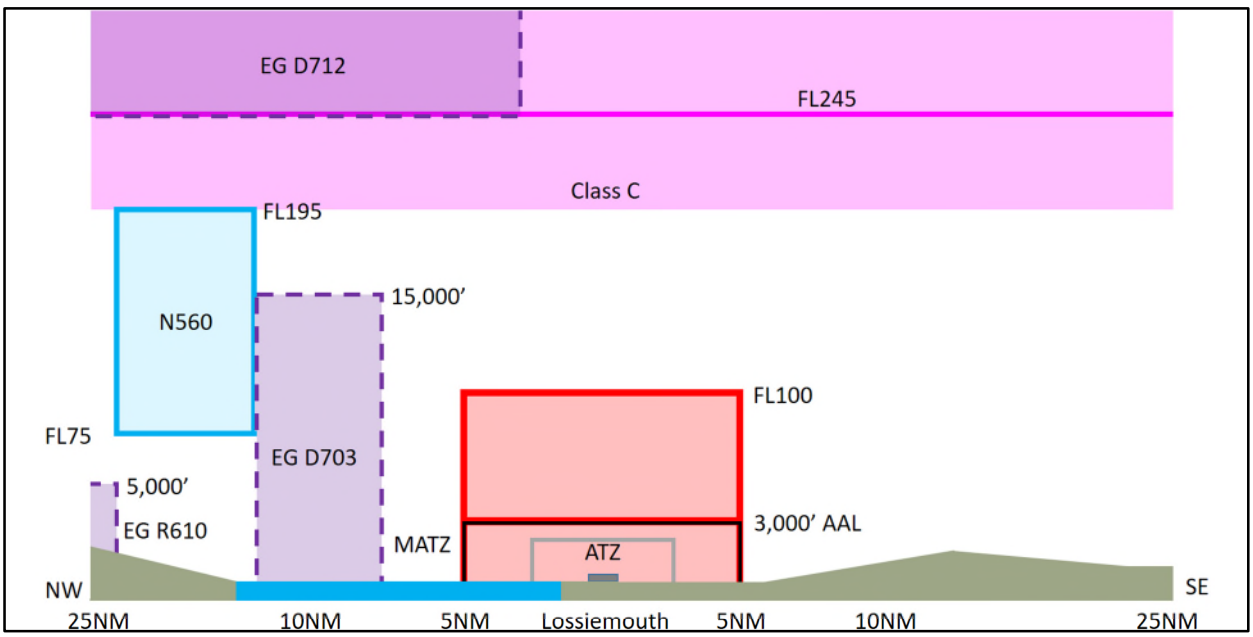

Figure 6 - RAF Lossiemouth TDA NW/SE Cross-section

Measures to Minimise the Impact on other Airspace Users

General

At either RAF location, the proposed TDA will not be permanently active; it will only be activated when SkyGuardian flying is due to take place. Proven procedures will be adopted to ensure that the airspace is activated and notified as and when required. This will involve appropriate NOTAM action being taken at least 24hrs in advance. To ensure minimum disruption to other airspace users a Danger Area Crossing Service (DACS) will be offered within both Areas A and B at both TDA locations. This means that, even if the airspace has been notified as being active, it may be possible for both civil and military aircraft to transit through it under a clearance from either RAF Waddington or RAF Lossiemouth ATC, as appropriate.

It is anticipated that RAF Waddington and RAF Lossiemouth ATC will be manned at all times during SkyGuardian operations within the proposed TDAs. SkyGuardian will be equipped with a transponder and will squawk as directed by ATC. Information on the current status of the airspace will be available including a DACS from Waddington or Lossiemouth ATC, as appropriate. An Aerodrome Flight Information Services (AFIS) will be available from London Flight Information.

Utilisation

The precise flying schedule has not yet been fully agreed, although it is envisaged that the majority of SkyGuardian flying will take place Monday – Friday during daylight hours.

As much information as possible will be made available in the run up to the arrival of SkyGuardian in the UK.

Opportunity for Stakeholders to join a Live Webex

Stakeholders will be invited to join a live Webex at 0900 - 1100hrs on Tuesday 9 February 2021 during which the most up-to-date information will be made available. Having read the material contained within this letter, please send any questions regarding the TDAs in advance to:

UASCDC-ACP@qinetiq.com.

All recipients of this letter will receive email containing an invitation to the Webex with the necessary joining information by 1700hrs on Friday 5 February 2021.

How to Provide Feedback

The MOD welcomes comments and feedback from all interested parties. All comments received regarding this proposal will be taken into consideration before a final design is submitted to the CAA. All the details of this airspace change proposal are available on the CAA's Airspace Change Portal. The ACP identification number is ACP-2020-100. Feedback on the proposed change and what is important to you should be sent to

The Airspace Change Manager at UASCDC-ACP@qinetiq.com

A feedback form is provided on the next page and a Word document is attached to the email containing this material for your use if you wish.

Responses regarding the proposed TDA submission must be received by 12 March 2021.

ACP-2020-100 Response Form

Name	
Representing	
Address (including postcode if possible)	
Feedback:	

MQ-9B SkyGuardian

Civilian Airspace Compliant

GENERAL ATOMICS AERONAUTICAL

Leading The Situational Awareness Revolution

MQ-9B SkyGuardian

Civilian Airspace Compliant

OBJECTIVE

Perform over-the-horizon long-endurance, medium-altitude Intelligence, Surveillance and Reconnaissance (ISR) missions.

CHARACTERISTICS

Wing Span:	79 ft (24m)
Length:	38 ft (11.7m)
Powerplant:	Honeywell TPE331-10 Turboprop Max Gross Takeoff Weight: 12,500 lb (5670 kg)
Fuel Capacity:	6,000 lb (2721 kg)
Payload Capacity:	4,750 lb (2155 kg) across 9 hardpoints (8 wing, 1 centerline) 800 lb internal (363 kg)
Power:	45 kVA
Backup Power:	2 kW

PERFORMANCE

Max Altitude:	40,000+ ft MSL
Max Endurance:	40+ hr
Max Air Speed:	210 KTAS
Max Range:	6,000+ nmi

CONTROL/DATA LINKS

Line-of-Sight:	C-Band
Over-the-Horizon:	X-, Ku-, or Ka-Band BLOS Backup Inmarsat

FEATURES

- High Definition EO/IR
- GA-ASI Lynx Multi-mode Radar
- Precision guided munitions
- Dual VHF/UHF certified radios
- DO-178 and DO-254 design assurance for software and avionics
- De-ice/Anti-ice system
- Detect and Avoid
  (TCAS/ADS-B and Due Regard Radar)
- STANAG 4671 compliant type certifiable design
- All weather capable including lightning protection
- Fatigue and damage tolerant airframe, 40,000 hour service life
- Automatic takeoff and land
- Fire protected engine bay
- Other customer specific payloads

MQ-9B SeaGuardian Mission Kit: (Optional)

– Multimode 360° Maritime Surface Search Radar

– Automatic Information System (AIS)

Integrated Mission and Civil Certified Avionics